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ABSTRACT

In looking at the hierarchical structure of a composition, it is practical to diagram the natural text in T-units in a three-dimensional matrix based on the three hierarchical relationships between T-units: coordinate, subordinate, and superordinate. In this matrix, a coordinate relationship, which results from conjoining, elaborating, and contradicting, is represented by juxtaposing a sphere in front of the preceding sphere; a subordinate relationship, which results from giving reasons, explaining, and defining, is represented by juxtaposing a sphere below the preceding sphere; and a superordinate relationship, which results from making conclusions or changing subjects, is represented by juxtaposing a sphere beside the previous sphere and on the same level and plane as the T-unit most parallel to it in function. Matrix diagraming is more useful than other macrostructure representations because it aids in the study of processing and production of texts and provides a graphic representation of the structure, making it possible to assess where reading difficulty is likely to occur. (A sample paragraph is used to illustrate the matrix process.) (TJ)

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The Discourse Matrix

Brent E. Davis
Ellen W. Nold

In his discussion of a hierarchical structure of discourse, Christensen[1] claims that every paragraph has a topic sentence, and that any subsequent sentence is either coordinate or subordinate to the one directly before it. As Karrfalt[2] notes, however, there is a major problem with Christensen's analysis in that sentences are frequently neither coordinate nor subordinate to the preceding sentence, but superordinate to it. Although D'Angelo[3] does not seem to recognize this problem, he does propose an interesting extension of Christensen's theory to the essay. This extension of "generative rhetoric" is necessary for both theoreticians and instructors, both of whom wish to account for and describe the way a reader makes sense of texts.

The generative rhetoricians have been joined in their search for a representation of the overall structure of texts by the cognitive psychologists, who have sought to predict from the structure of texts the reader's psychological difficulty in reading them. Two such psychologists, Kintsch and Vipond[4] represent macrostructure by establishing agreed-upon sections of a text and then agreed-upon sentences that summarize the gist of each section. The entire set of these gist-sentences, or the "macrotext", is then submitted to a propositional analysis such as described in Kintsch's 1975 work.[5] The readability of the text is predicted to be proportional to the load it puts on short-term memory, which Kintsch and Vipond suggest is directly related to the number and well-orderedness of repetitions

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of arguments between propositions. Though this system appears to be able to predict readability of a text more accurately than other readability formulas, it is much too cumbersome a technique to be used pedagogically, and it avoids considering the psychological processes involved in the reader's construction of the macrotext in the first place.

It seems more practical to both theoreticians and instructors of composition to diagram the "natural" text in constructing a representation of its hierarchical structure. Psycholinguists[6] have established the psychological salience of the T-unit as defined by Hunt[7], showing that a reader keeps the elements of each T-unit in short-term memory until the end of the T-unit is reached. The contents of that T-unit are then recoded and passed on to the long-term memory where they are stored hierarchically as a part of a growing meaning representation of the text. Our system of representing this structure as a matrix of T-units is based on the established salience of the T-unit (denoted by a numbered sphere) and the three hierarchical relationships between T-units: coordinate, subordinate and superordinate. These relationships are determined both analytically and intuitively by the reader using his knowledge of the referential and logical relationships between the T-units of a text. In our system, a coordinate relationship is represented by juxtaposing a sphere in front of the preceding sphere, a subordinate relationship by juxtaposing a sphere below the preceding sphere, and a superordinate relationship by juxtaposing a sphere beside the previous sphere and on the same level and plane as the T-unit most parallel to it in function. The diagrams that follow are two-dimensional representations of this three-dimensional model, each dimension representing one of the three relationships.

In order to illustrate the construction of the discourse matrix, we will diagram the following paragraph from an essay by George P. Elliott (A Piece of Lettuce. Random House, p. 248). The beginnings of T-units are indicated by numbers in parentheses.

> (1) There is an amazement proper to the experience of all great art, (2) but the special amazement which War and Peace revives in me while I am reading it is like that of a child. (3) The child does not expect the unexpected; (4) that would already be a preparation against it. (5) He does not for an instant doubt that a certain event had to happen; (6) such a doubt obscures. (7) He may even have been told beforehand that it was going to happen; (8) such foreknowledge is as little part of him as is a label in his cap. (9) He is able to look at the thing itself. (10) The event reaches him radiant with magical causes but not yet trapped in sufficient cause. (11) Tolstoy does not, as many do, achieve this freshness by transforming the reader into a never-never land. (12) On the contrary, his fictional mode is realistic; (13) the people in his novel appear and behave like possible people in the world we daily live in. (14) His achievement is the greater because he uses the mode of realism, for realism offers a threat to which other literary modes are not subject, the encroachment of mediocrity.

The first four T-units of the discourse are diagrammed in Figure 1.

(Insert Figure 1)

The first two T-units are coordinate to each other in that they both speak of a type of "amazement" and are conjoined with the coordinate conjunction "but". T-unit three is subordinate to T-unit two in that it specifies the ways that the simile in T-unit two operates to describe the "special amazement": it gives one quality of a child that makes his amazement different from that of an adult. T-unit four is subordinate to T-unit three in that it gives a reason for the truth of the statement made in T-unit three.

The next four T-units, five through eight, are diagrammed in Figure 2.

(Insert Figure 2)

T-unit five, like T-unit three, describes another quality of the child mentioned in T-unit two and thus has the same relationship to T-unit two as T-unit three does; therefore, T-unit five is superordinate to T-unit four and is placed on the same level as T-unit three, to which it is most closely parallel. T-unit six, on the other hand, is subordinate to T-unit five in the same way that T-unit four is subordinate to T-unit three in that it gives a reason for the truth of the statement made in T-unit five.

T-unit seven, like T-unit five, also describes a quality of the child mentioned in T-unit two and so is superordinate to T-unit six and placed on the same level as T-unit five. T-unit eight is subordinate to T-unit seven since it gives the reason whereby one may dismiss T-unit seven's apparent contradiction of the truth of T-unit five. The word "even" also indicates that T-unit seven is parallel to T-units three and five.

The final five T-units, nine through fourteen, are added to the diagram in Figure 3.

(Insert Figure 3)

T-unit nine, like T-unit seven, describes yet another quality of the child mentioned in T-unit two and therefore is superordinate to T-unit eight and placed on the same level as T-unit seven. T-unit ten elaborates on the act of "looking at the thing itself" in T-unit nine and so is coordinate to it. Although the "freshness" spoken of in T-unit eleven refers to the "special amazement" in T-unit two; instead, it mentions Tolstoy and the method by which the facts of T-unit two came to be. T-unit eleven is therefore superordinate to T-unit ten and is placed on the level and plane of T-unit two. T-unit twelve contradicts T-unit eleven and is therefore coordinate to it. T-unit thirteen is subordinate to T-unit twelve in that it gives a definition of a term in T-unit twelve. The "achievement" mentioned in T-unit fourteen refers to the one spoken of in T-unit eleven, but T-unit fourteen mainly elaborates on the effects of the "realism" asserted in T-unit twelve. Thus, it is superordinate to T-unit thirteen and placed on the level of T-unit twelve.

Our analysis of this passage pinpoints some of the principles by which we can judge whether a T-unit is subordinate, coordinate or superordinate to the previous one. Subordination results from giving reasons, explanations and definitions. Coordination results from conjoining, elaborating and contradicting. Superordination results from moving upward in abstraction level to make conclusions or change

subjects. Of course, there are many other rhetorical moves that result in coordination and subordination, but this passage does not illustrate them. An exhaustive list requires further study.

Just as an entire T-unit is represented as a single element in the diagram of a paragraph, this entire matrix could now be represented as a single element in a matrix of paragraphs comprising an essay. In such diagrams, individual paragraphs, as well as clusters of coordinate and subordinate paragraphs, parallel roughly Rodger's "stadia of discourse".[8]

Matrix diagramming is more useful than other macrostructure representations in that it aids in the study of both processing and production of texts. It is useful in studying processing because it provides us with a graphic representation of the structure of texts, thereby allowing us to assess where reading difficulty is most likely to occur. We might expect, for instance, that such difficulty would be more likely to occur during the ordination of one T-unit to another. In addition, we can predict that the greater the number of T-units between the superordinate T-unit and the T-unit directly to the left of it on the same plane (which we term a "node pair"), the greater the degree of reading difficulty at that point of superordination. The superordinate relationship between T-units ten and eleven should be more difficult to process than that between T-units eight and nine, since the node pair two/eleven is separated by eight T-units, whereas the node pair seven/nine is separated by only one. We might also expect that major structural flaws in a text, such as irrelevant information, would show up as irregularities in the matrix.

Matrix diagramming also illustrates difficulties in production. In a study by A. Matsuhashi and C. Cooper,[9] students were videotaped while composing essays, and then lengths of the pauses between their words were clocked and analyzed. When the texts they had composed were then diagrammed with our matrix system, points of superordination were indeed found to correspond with the longer pauses, and length of pause was found to be directly proportional to the number of T-units between the two nodes of the resulting node pair. Further study of Matsuhashi and Cooper's data gives strong indication that logical movement between the three dimensions of the discourse matrix may be necessary (though not sufficient) for coherent and well-formed discourse and is probably accomplished through a series of strategic switches in abstraction level, as Freedman and Nold[10] suggest. It even seems to be possible to derive from the structure of the discourse matrix a set of specific rules for the production of well-formed discourse. Violations of these rules, such as the one that prohibits movement to the left in the diagrams of the discourse matrix, consistently show up as flaws in the structure of the resulting paragraph. Final results await completion of analysis of the data, but if matrix diagramming indeed not only illustrates difficulties in the composing and comprehension process, but yields principles for the production of well-formed discourse, it is of great importance to all involved in the pedagogy of writing.

Stanford University

Footnotes

1. Frances Christensen, "A Generative Rhetoric of the Paragraph," College Composition and Communication, XVI, (1965), 144-156.

2. David H. Karrfalt, "Generation of Paragraphs and Larger Units," College Composition and Communication, XVII, (1966), 82-87.

3. Frank J. D'Angelo, A Conceptual Theory of Rhetoric (Cambridge, Massachusetts: Winthrop Publishers, 1975).

4. Walter Kintsch and Douglas Vipond, "Reading Comprehension and Readability in Educational Practice and Psychological Theory," L.G. Nilsson (Ed.), Proceedings of the Conference on Memory (Hillsdale, N.J.: Lawrence Erlbaum Associates, 1975).

5. Walter Kintsch, "Memory Representations of Text," R.L. Solso (Ed.), Information Processing and Cognition (Hillsdale, N.J.: Lawrence Erlbaum Associates, 1975).

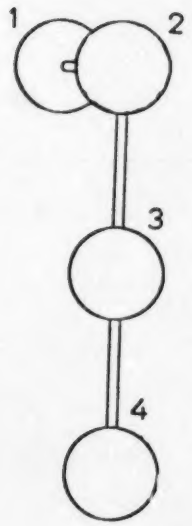
6. Herbert H. Clark and Eve V. Clark, Psychology and Language (New York: Horcourt, Brace, Jovanovich, 1977).

7. Kellogg W. Hunt, Grammatical Structures Written at Three Grade Levels (Champaign, Illinois: National Council of Teachers of English, 1965).

8. Paul C. Rodgers, Jr., "A Discourse-centered Rhetoric of the Paragraph," College Composition and Communication, XVII, (1966), 2-11.

9. Ann Matsuhashi and Charles Cooper, "A Video Time-Monitored Observational Study: The Transcribing Behavior and Composing Processes of a Competent High School Writer," (Unpublished paper: State University of New York, Buffalo, NY, 1978).

10. Sarah W. Freedman and Ellen W. Nold, "The Ladder of Abstraction," (Unpublished paper: Stanford University, Stanford, CA, 1976).



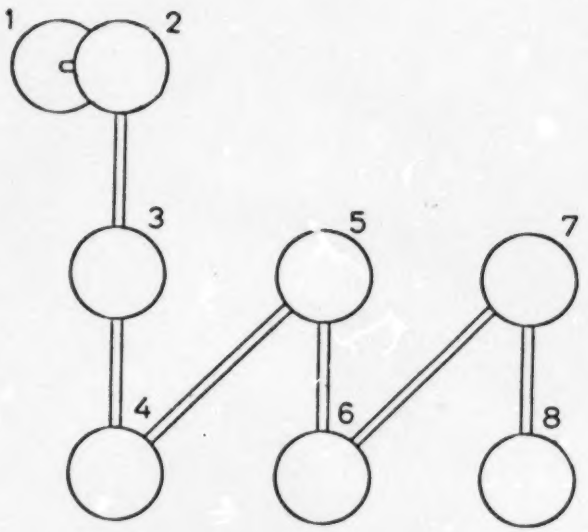
(1) There is an amazement proper to the experience of all great art,

(2) but the special amazement which War and Peace revives in me while I am reading it is like that of a child.

(3) The child does not expect the unexpected;

(4) that would already be a preparation against it.

Figure 1



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(8) such foreknowledge is as little a part of him as is a label in his cap.

Figure 2

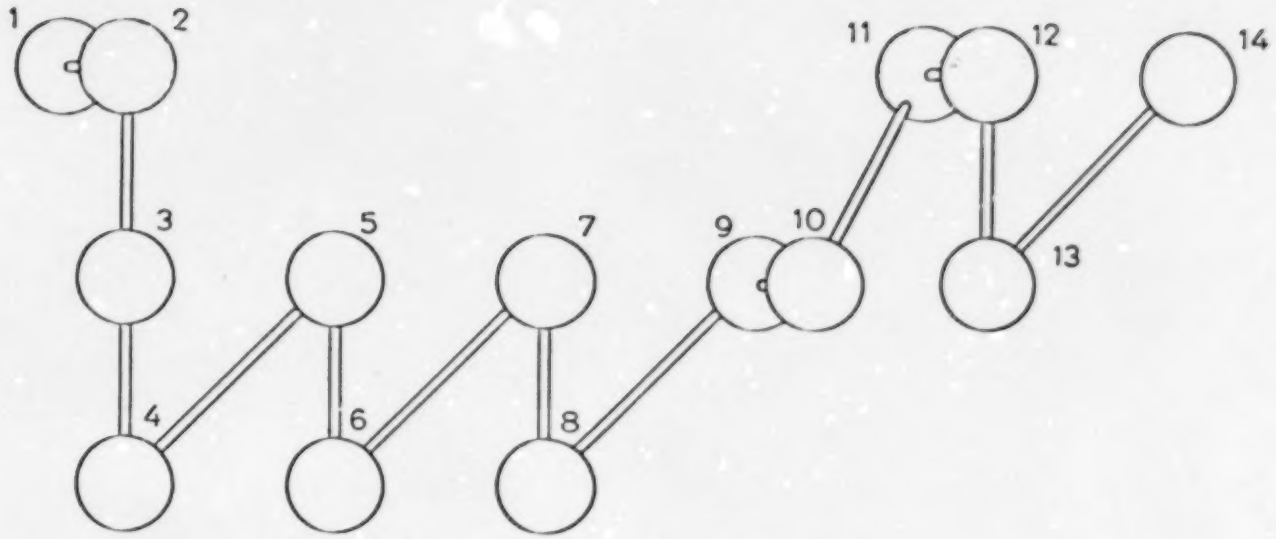

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Figure 3